

AMENDMENTS TO THE CLAIMS

Claim 1 (Original): A high-strength steel sheet having excellent workability comprising:

0.06 to 0.25 % by mass of carbon;

0.5 to 3.5 % by mass of Si; and

0.7 to 4 % by mass of Mn,

wherein mother structure of said steel sheet is ferrite, second phase structure of said steel sheet comprises martensite and the residual austenite and said second phase structure ($\alpha_1 + \gamma_R$) has an area fraction of 25 % or less based on the total structure when it is measured by image analysis,

and wherein said steel sheet satisfies the following requirements (1) to (3):

(1) the volume fraction ($V_{t\gamma_R}$) of said residual austenite is 5 % or more when a measurement specimen of said residual austenite is measured by saturation magnetization measurement,

(2) the ratio ($SF_{\gamma_R} / V_{t\gamma_R}$) of the area fraction (SF_{γ_R}) of said residual austenite within the ferrite particle to $V_{t\gamma_R}$ is 0.65 or more when the area fraction is measured by FE-SEM/EBSP, and

(3) the ratio [$\alpha_2 / (\alpha_1 + \gamma_R)$] of the space factor (α_2) of said martensite to the second phase structure ($\alpha_1 + \gamma_R$) satisfies the following expression:

$$0.25 \leq [\alpha_2 / (\alpha_1 + \gamma_R)] \leq 0.60,$$

wherein the space factor (α_2) is calculated from a difference between the second phase structure ($\alpha_1 + \gamma_R$) and the residual austenite ($V_{t\gamma_R}$).

Claim 2 (Currently Amended): A high-strength steel sheet having excellent workability comprising:

0.06 to 0.25 % by mass of carbon;

0.5 to 3.5 % by mass of Si; and

0.7 to 4 % by mass of Mn,

wherein mother structure of said steel sheet is ferrite, second phase structure of said steel sheet comprises martensite and the residual austenite and said second phase structure ($\alpha_1 + \gamma_R$) has an area fraction of 25 % or less based on the total structure when it is measured by image analysis,

and wherein said steel sheet satisfies the following requirements (1), (4) and (3):

(1) the volume fraction ($V_{t\gamma_R}$) of said residual austenite is 5 % or more when a measurement specimen of said residual austenite is measured by saturation magnetization measurement,

(4) the average C content of said residual austenite is 0.95 to ~~1.2~~ 1.15 % by mass, and

(3) the ratio [$\alpha_2/(\alpha_1 + \gamma_R)$] of the space factor (α_2) of said martensite to the second phase structure ($\alpha_1 + \gamma_R$) satisfies the following expression:

$$0.25 \leq [\alpha_2/(\alpha_1 + \gamma_R)] \leq 0.60,$$

wherein the space factor (α_2) is calculated from a difference between the second phase structure ($\alpha_1 + \gamma_R$) and the residual austenite ($V_{t\gamma_R}$).

Claim 3 (Currently Amended): A process for producing ~~the a~~ high-strength steel sheet ~~of claim 1 by hot rolling, optionally cold rolling and continuous annealing, the process~~ comprising ~~the steps of:~~

subjecting a steel slab, which comprises ~~the components set forth in claim 1~~

0.06 to 0.25 % by mass of carbon,

0.5 to 3.5 % by mass of Si, and

0.7 to 4 % by mass of Mn,

to solution treatment at 1,270°C or higher for 5 hours or more;

hot rolling the slab into a steel sheet; and

subjecting the steel sheet to austempering ~~to be wound up, after the hot rolled plate is~~
~~cooled to a~~ by cooling the steel sheet after the hot rolling to the bainite transformation range
and ~~maintained at~~ maintaining the steel sheet within that temperature range for 50 to 200
seconds.

Claim 4 (Canceled)

Claim 5 (New): The process according to Claim 3, further comprising cold rolling the steel sheet after the austempering.

Claim 6 (New): The process according to Claim 5, further comprising subjecting the cold rolled steel sheet to continuous annealing.

Claim 7 (New): The steel sheet according to Claim 2, wherein the residual austenite having the average C content of 0.95 to 1.15 % by mass is within each ferrite particle.